WHAT IS CLAIMED IS:

1. A computer program product encoded in computer readable media, the computer program product comprising:

first instructions, executable by the processor, for receiving input information regarding damaged vehicle components for at least one vehicle;

second instructions, executable by the processor, for categorizing damage zones with respect to the location of the bumper of a vehicle;

third instructions, executable by the processor, for categorizing a vehicle component with respect to its location on the vehicle; and

fourth instructions, executable by the processor, for [determining] estimating change in the vehicle's velocity as a result of a collision based on the damaged vehicle components information.

2. The computer program product of claim 1, wherein the information regarding damaged vehicle components includes particular damaged vehicle components, locations of damaged vehicle components, depth information corresponding to the damaged vehicle components, and an overall vehicle damage rating.

3. The computer program product of claim 2 further comprising:

fifth instructions, executable by the processor, for comparing the overall vehicle damage rating to a crash test vehicle damage rating and using the comparison to determine whether to use crash test data to [determine] estimate the change in the vehicle's velocity.

4. The computer program product of claim 3 further comprising:

sixth instructions, executable by the processor, for determining whether to use crash test data to [determine] estimate the change in the vehicle's velocity based on the location of damaged components.

5. The computer program product of claim 4 further comprising:

seventh instructions, executable by the processor, for comparing the location of damaged components on vehicles involved in the same collision to

determine whether to use crash test data to determine the change in velocity for at least one of the vehicles.

6. The computer program product of claim 3 further comprising:

sixth instructions, executable by the processor, for comparing characteristics of a damaged vehicle to characteristics of vehicles for which crash test data is available, and determining whether crash test data for a particular vehicle is applicable to the damaged vehicle.

7. The computer program product of claim 1 further comprising:

fifth instructions, executable by the processor, for determining a coefficient of restitution to use in estimating the change in the vehicle's velocity.

8. The computer program product of claim 3 further comprising:

sixth instructions, executable by the processor, for determining the change in the vehicle's velocity using conservation of momentum; and

seventh instructions, executable by the processor, for determining whether to use the change in the vehicle's velocity based on the crash data, or the change in the vehicle's velocity based on conservation of momentum, as input to a multi-method change in velocity combination generator.

9. The computer program product of claim 1 further comprising:

fifth instructions, executable by the processor, for computationally determining the change in a vehicle's velocity as a result of a collision based on a crush threshold energy.

10. The computer program product of claim 9 further comprising:

sixth instructions, executable by the processor, for estimating deformation energy based on a one-way spring model.

11. The computer program product of claim 9 further comprising:

seventh instructions, executable by the processor, for estimating principal forces based on at least one stiffness parameter and the depth information.

12. The computer program product of claim 11 further comprising:

eighth instructions, executable by the processor, for comparing principal forces for at least two vehicles and determining whether the stiffness parameters and the depth information may be adjusted within predetermined thresholds to substantially balance the principal forces.

13. The computer program product of claim 12 further comprising:
ninth instructions, executable by the processor, for comparing principal forces for at least two vehicles and determining whether vehicle parameters may be adjusted within predetermined thresholds to substantially balance the principal forces.

14. The computer program product of claim 13 further comprising:
tenth instructions, executable by the processor, for generating a graphical user interface, wherein the graphical user interface includes a visual indicator of the balance of the principal forces, and selectable input information fields to allow a user to manually adjust the vehicle parameters.

15. The computer program product of claim 14 further comprising:
eleventh instructions, executable by the processor, for determining closing velocity based on an estimate of a coefficient of restitution.

16. The computer program product of claim 15 further comprising:
twelfth instructions, executable by the processor, for determining a distribution of changes in velocity by varying parameters used to estimate the change in velocity; and
thirteenth instructions, executable by the processor, for estimating statistical error in the distribution of changes in velocity.

17. The computer program product of claim 16 further comprising:
fourteenth instructions, executable by the processor, for varying parameters according to statistical distribution functions.

18. The computer program product of claim 17 further comprising:

fifteenth instructions, executable by the processor, for estimating the distribution of changes in velocity using stochastic simulation.

19. The computer program product of claim 18 further comprising:
sixteenth instructions, executable by the processor, for determining stiffness parameters based on the position of the vehicle's bumper relative to the position of another vehicle's bumper.

20. The computer program product of claim 19 further comprising:
seventeenth instructions, executable by the processor, for determining the position of the vehicle's bumper relative to the position of another vehicle's bumper based on the location of damage to each vehicle.

21. The computer program product of claim 3 further comprising:
sixth instructions, executable by the processor, for determining the change in the vehicle's velocity as a result of a collision based on a plurality of estimation methods including estimation based on one set of crash test data, estimation based on another set of crash test data, and estimation based on conservation of momentum; and
seventh instructions, executable by the processor, for weighting the results of each estimation method and combining the weighted estimates to determine a final estimate for the change in the vehicle's velocity.

22. The computer program product of claim 21 further comprising:
eighth instructions, executable by the processor, for using a statistical method for weighting the results of each estimation method.

23. The computer program product of claim 22 wherein the statistical method for weighting the results of each estimation method is the t-test.

24. A computer system comprising:
a processor;
computer readable medium coupled to the processor;

first computer code, encoded in the computer readable medium and executable by the processor, for generating a first graphical user interface, wherein the first graphical user interface includes a first screen object representing a vehicle, a second screen object having data entry fields to allow entry of damaged vehicle components and repair/replace estimate information;

second computer code, encoded in the computer readable medium and executable by the processor, for generating a second graphical user interface, wherein the second graphical user interface includes a first screen object representing the vehicle, and a second screen object having data entry fields to allow entry of damaged vehicle components and visual damage information;

third computer code, encoded in the computer readable medium and executable by the processor, for rating damage severity of each vehicle component according to a set of predetermined rules;

fourth computer code, encoded in the computer readable medium and executable by the processor, to determine an overall damage rating for the vehicle based on rated damage to the vehicle components; and

fifth computer code, encoded in the computer readable medium and executable by the processor, to compare the overall damage rating for the vehicle to a crash test vehicle having an overall rating based on component damage ratings in accordance with the set of rules.

sixth computer code, encoded in the computer readable medium and executable by the processor, for determining change in the vehicle's velocity as a result of a collision, the change in the vehicle's velocity being based on the damaged vehicle components and the component damage ratings.

25. The computer system of claim 24 further comprising:

seventh computer code, encoded in the computer readable medium and executable by the processor, for determining an overall vehicle damage rating based on at least one component damage rating; and

eighth computer code, encoded in the computer readable medium and executable by the processor, for comparing the overall vehicle damage rating to a crash test vehicle damage rating to determine whether to use crash test data to determine the change in the vehicle's velocity.

26. The computer system of claim 25 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for determining whether to use crash test data to estimate the change in the vehicle's velocity based on the location of damaged components.

27. The computer system of claim 25 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for comparing the location of damaged components on vehicles involved in the same collision to determine whether to use crash test data to estimate the change in velocity for at least one of the vehicles.

28. The computer system of claim 25 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for comparing characteristics of a damaged vehicle to characteristics of vehicles for which crash test data is available, and determining whether crash test data for a particular vehicle is applicable to the damaged vehicle.

29. The computer system of claim 25 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for generating a coefficient of restitution for estimating the change in the vehicle's velocity.

30. The computer system of claim 25 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for determining the change in the vehicle's velocity using conservation of momentum; and

tenth computer code, encoded in the computer readable medium and executable by the processor, for determining whether to use the change in the vehicle's velocity based on the crash data, or the change in the

vehicle's velocity based on conservation of momentum, as input to a multi-method change in velocity combination generator.

31. The computer system of claim 24 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for computationally estimating the change in a vehicle's velocity as a result of a collision based on crush threshold energy.

32. The computer system of claim 31 further comprising:

tenth computer code, encoded in the computer readable medium and executable by the processor, for estimating deformation energy based on a one-way spring model.

33. The computer system of claim 24 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for estimating principal forces based on at least one stiffness parameter and the depth information.

34. The computer system of claim 33 further comprising:

tenth computer code, encoded in the computer readable medium and executable by the processor, for comparing principal forces for at least two vehicles and determining whether the stiffness parameters and the depth information may be adjusted within predetermined thresholds to substantially balance the principal forces.

35. The computer system of claim 34 further comprising:

eleventh computer code, encoded in the computer readable medium and executable by the processor, for comparing principal forces for at least two vehicles and determining whether vehicle parameters may be adjusted within predetermined thresholds to substantially balance the principal forces.

36. The computer system of claim 29 further comprising:

tenth computer code, encoded in the computer readable medium and executable by the processor, for determining closing velocity based on an estimate of the coefficient of restitution.

37. The computer system of claim 36 further comprising:

eleventh computer code, encoded in the computer readable medium and executable by the processor, for determining a distribution of changes in velocity by varying parameters used to determine the change in velocity; and

twelfth computer code, encoded in the computer readable medium and executable by the processor, for estimating statistical error in the distribution of changes in velocity.

38. The computer system of claim 37 further comprising:

thirteenth computer code, encoded in the computer readable medium and executable by the processor, for varying parameters according to statistical distribution functions.

39. The computer system of claim 37 further comprising:

thirteenth computer code, encoded in the computer readable medium and executable by the processor, for estimating the distribution of changes in velocity using stochastic simulation.

40. The computer system of claim 29 further comprising:

tenth computer code, encoded in the computer readable medium and executable by the processor, for determining stiffness parameters based on the position of the vehicle's bumper relative to the position of another vehicle's bumper.

41. The computer system of claim 24 further comprising:

seventh computer code, encoded in the computer readable medium and executable by the processor, for determining the change in the vehicle's velocity as a result of a collision based on a plurality of

estimation methods including estimation based on one set of crash test data, estimation based on another set of crash test data, and estimation based on conservation of momentum; and

eighth computer code, encoded in the computer readable medium and executable by the processor, for weighting the results of each estimation method and combining the weighted estimates to determine a final estimate for the change in the vehicle's velocity.

42. The computer system of claim 41 further comprising:

ninth computer code, encoded in the computer readable medium and executable by the processor, for using a statistical method for weighting the results of each estimation method.

43. The computer system of claim 42 wherein the statistical method for weighting the results of each estimation method is the t-test.

44. A computer-implemented method for estimating the change in velocity of a vehicle as a result of a collision, the method comprising:

(a) acquiring information regarding damaged components of at least one vehicle;

(b) assigning a damage rating to the at least one vehicle;

(c) determining whether to utilize crash test data for a first estimate of the change in velocity for the at least one vehicle based at least partially on the damage rating;

(d) determining a second estimate of the change in velocity for the at least one vehicle based on conservation of momentum;

(e) determining a third estimate of the change in velocity for the at least one vehicle based on deformation energy; and

(f) determining a final estimate of the change in velocity for the at least one vehicle based on at least one of the first, second, and third estimates of the change in velocity.

45. The method, as set forth in claim 44, wherein (c) further comprises:

determining whether to utilize crash test data for a first estimate of the change in velocity for the at least one vehicle based on the location of damaged components.

46. The method, as set forth in claim 44, wherein (c) further comprises: comparing the location of damaged components on vehicles involved in the same collision to determine whether to use crash test data to determine the change in at least one of the vehicles' velocity.

47. The method, as set forth in claim 44, wherein (c) further comprises: comparing characteristics of a damaged vehicle to characteristics of vehicles for which crash test data is available, and determining whether crash test data for a particular vehicle is applicable to the damaged vehicle.

48. The method, as set forth in claim 44, wherein (e) further comprises: estimating principal forces based on at least one stiffness parameter and the depth information.

49. The method, as set forth in claim 44, wherein (e) further comprises: comparing principal forces for at least two vehicles and determining whether vehicle parameters may be adjusted within predetermined thresholds to substantially balance the principal forces.

50. The method, as set forth in claim 44, wherein (e) further comprises: determining a distribution of changes in velocity by varying parameters used to determine the change in velocity and estimating statistical error in the distribution of changes in velocity.

51. The method, as set forth in claim 44, wherein (e) further comprises: varying parameters according to a stochastic simulation.

52. The method, as set forth in claim 44, wherein (e) further comprises: determining stiffness parameters based on the position of the vehicle's bumper relative to the position of another vehicle's bumper.

53. The method, as set forth in claim 44, wherein (f) further comprises: weighting the first, second, and third estimates of the change in velocity and combining the weighted estimates to determine the final estimate for the change in the vehicle's velocity.

54. The method, as set forth in claim 53, wherein (f) further comprises using a statistical method for weighting the results of each estimation method.

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